# GUIDANCE FOR DEVELOPING A SAMPLE SITING PLAN FOR BACTERIOLOGICAL MONITORING OF COMMUNITY AND NON-COMMUNITY PUBLIC WATER SYSTEMS

## INTRODUCTION

One of the requirements of the Total Coliforms Rule is that each public water supply system (community and non-community), have a written sample siting plan to follow when collecting total coliform samples from the distribution system. Each system is responsible for developing this plan and revising it as needed as the system grows or as sampling requirements outlined in the State Primary Drinking Water Regulations change.

Permit Applications for the construction of new water systems must include a sample siting plan as part of its Management Plan which is required to for the purpose of demonstrating viability [refer to Section R.61-58.1(B)(4)].

The Department will conduct periodic reviews of each system's sample siting plan as part of its sanitary survey program. If the Department determines that the plan is inadequate, it must be revised immediately.

## CRITERIA FOR DEVELOPING A SAMPLE SITING PLAN

The sampling program must be designed to ensure that there is no place in the distribution system where microbiological contamination could persist indefinitely with little chance of detection. The sample siting plan is a written document which describes in detail how this will be accomplished.

The plan must include a map of the distribution system and a detailed description of how the sampling program will be carried out. The distribution map must show the location of all distribution lines, water sources, storage tanks and sampling sites. Very small public water systems such as restaurants, convenience stores, day care centers, office buildings, etc., will not be required to include a map as part of their plan.

The adequacy of the plan will be based on the following criteria:

1. At least one sampling site shall be chosen for each major portion and each isolated portion of the distribution system. Major portions of a distribution system include areas such as business districts, subdivisions, industrial parks, etc. Depending on the size of the business district, subdivision, etc., more than one sample per major portion may be required to adequately monitor the system. When identifying isolated portions of a distribution system, consideration must be given to the direction of flow and location of the water sources and storage tanks.

2. Source, treatment and storage facilities must <u>not</u> be included in the plan as routine sampling sites.

3. The minimum number of sampling sites shall equal the minimum number of samples required per month or per quarter for non-community systems serving less than 1000 people. For example, if a system is required to take 20 samples per month, there shall be at least 20 sampling sites throughout the distribution system. If the 20 sites chosen do not provide adequate coverage of the distribution system, additional sampling sites must be selected (refer to item 1 above). This does not necessarily mean that the number of samples required per month will increase; however, it could (refer to item 4 below).

4. The minimum number of sampling sites to be monitored each month (or quarter) shall equal the number of monthly (or quarterly) samples required. For example, if 20 samples are required per month, 20 different sites must be monitored per month.

5. All sampling sites chosen should be sampled at least every three months. For example, a system is required to take 20 samples per month based on population; however, 40 sampling sites have been selected in order to satisfy item #1 above. In this case, the system will take samples from 20 of the sites one month and samples from the other 20 sites the next month, and continue this rotation month by month. The result is that each site will be sampled every two months, which satisfies the criteria for sampling each site at least every 3 months. This criteria may require some systems to take more than the minimum number of samples per month based on population. For example, a system is required to take 20 samples per month based on population; however, 75 sites have been selected in order to satisfy item #1 above. In order to sample each site at least every three months 25 samples will need to be collected each month.

6. The routine samples shall be collected at regular time intervals throughout the month, unless the system serves 4,900 persons or fewer and uses groundwater not under the direct influence of surface water. For example, a system that is required to take a minimum of 8 samples per month should take two samples per week.

7. The system must have adequate sanitary protection. If the sanitary survey reveals any deficiencies in the sanitary protection of the system, the Department may increase the number of samples to be taken per month. Examples of such deficiencies are an inadequate cross connection control program, inadequate sanitary well seal, hatches and screens on ground and elevated storage tanks not being properly maintained, inadequate leak detection and repair program.

8. For systems that are required to take less than 5 samples-per month the plan must address how sampling will be conducted the month following the detection of coliform in any routine or repeat sample. If a system that is required to collect less than 5 routine samples per month detects coliform in any routine or repeat sample, 5 routine samples must be collected the following month.

9. Routine samples shall not be collected from the same sampling site on the same day.

**NOTE: T**he sample siting plan **must** be revised immediately when there is a change in the required number of samples to be collected per month,.

## EXAMPLE PLAN # 1

In this example we have a restaurant with its own well system. This plan is also representative of the type of plan required for convenience stores, day care centers, small businesses, etc.

This is a non-community system and is required to take 1 sample per quarter.

This is a very small system, thus a distribution map is not needed. Only a written description is needed describing where and how often the sample is taken. The written plan is as follows:

SAMPLE SITING PLAN FOR
BACTERIOLOGICAL MONITORING
OF
JOHN DOE'S RESTAURANT
DHEC SYSTEM # 4070200

John Doe's Restaurant serves approximately 300 customers per day and is required to collect a minimum of 1 total coliform sample per calendar quarter.

The restaurant will initiate bacteriological self monitoring during the month of January 1991, and will take a minimum of 1 sample every three months thereafter (i.e., January, April, July and October) from one of the following sampling sites.

Sampling sites:

1. Vegetable preparation sink
2. Three compartment utensil sink;
3. Waitress glass filler;
4. Hand washing lavatory;
5. Lavatory in men’s restroom; and,
6. Lavatory in women’s restroom.

Only those faucets used for human consumption (i.e. water used for drinking, bathing, cooking, dishwashing and maintaining oral hygiene or other similar uses) will be used as sampling sites. Outside spigots and service sinks (can wash, mop sinks) should not be used as sampling sites.

If any routine or repeat sample is total coliform positive, then 5 routine samples will be taken the following month. These samples will be taken from each of the sampling sites listed above and will be collected on the same day.

## EXAMPLE PLAN # 2

In this example we have a subdivision with 48 taps and is served by one well. A distribution map is shown in figure 1. This plan is also representative of the type of plan for mobile home parks, campgrounds, industries with several structures being served water, etc.

This is a community system and has a population of 144 people. Based on population this system is required to take a minimum of 1 sample per month. The written plan is as follows:

SAMPLE SITING PLAN FOR
BACTERIOLOGICAL MONITORING
OF
LAKE MURRAY SUBDIVISION
DHEC SYSTEM 1# 4050200

The Lake Murray Subdivision public water system serves 48 residential service connections with a population of approximately 144 people.

The attached map (figure 1) shows the location of the well, storage tank and distribution lines. Also shown on the map are three sampling sites.

One routine sample will be collected each month.

The location from which this sample will be taken will rotate between the sampling sites shown on the attached map. The January 1991 sample will be collected from site number 1, the February 1991 sample will be collected from site number 2 and the March 1991 will be collected from site number 3. This rotation will start over again in April 1991. The goal is to collect a sample from each site at least every three months.

If a routine or repeat sample is total coliform positive, then 5 routine samples will be taken the following month. These five samples will be collected from the 3 sampling sites shown on the attached map. Each of the three sites will be sampled at least once during this month. No samples will be collected from the same site on the same day.

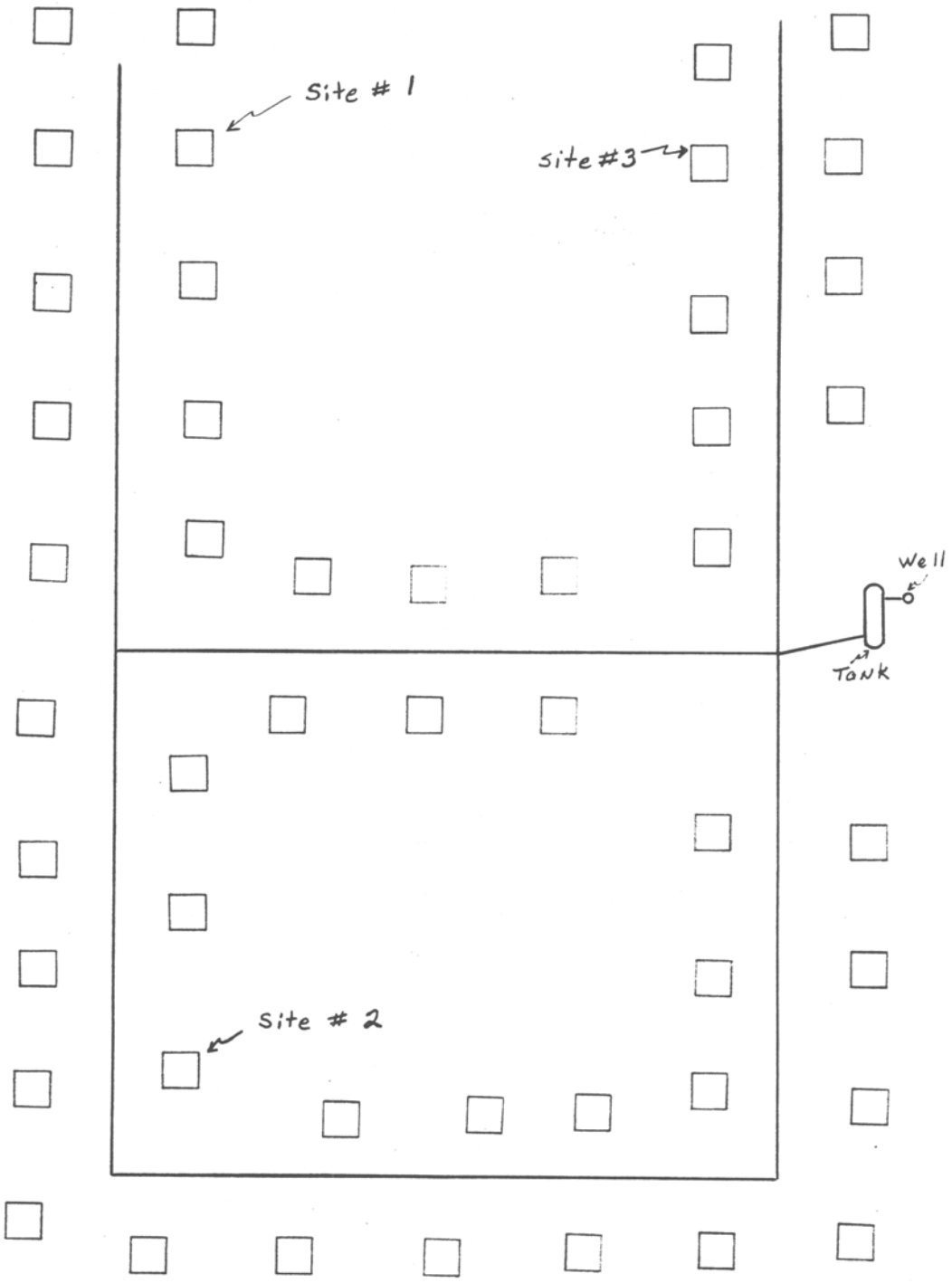


**FIGURE 1. LAKE MURRAY SUBDIVISION SAMPLE SITING PLAN MAP**

## EXAMPLE PLAN # 3

In this example we have a town which has a surface water treatment plant and serves a population of approximately 7000 people.

A distribution map is shown in figure 2. This is a community system and based on population it is required to take a minimum of 8 samples per month. The written plan is as follows:

SAMPLE SITING PLAN FOR
BACTERIOLOGICAL MONITORING OF
TIGER TOWN
DHEC SYSTEM # 4010200

The Tiger Town public water system serves approximately 7000 people and is required to collect a minimum of 8 routine total coliform samples per month.

The attached map (figure 2) shows the location of the surface water treatment plant, the elevated storage tank and distribution lines. Also shown on the map are 16 sampling sites.

Routine total coliform samples will be collected from sites 1 through 8 in one month and sites 9 through 16 the following month. Therefore, each site will be sampled at least every two months.

**Note:** 16 sites were chosen in order to provide adequate coverage of the system (refer to criteria # 1).

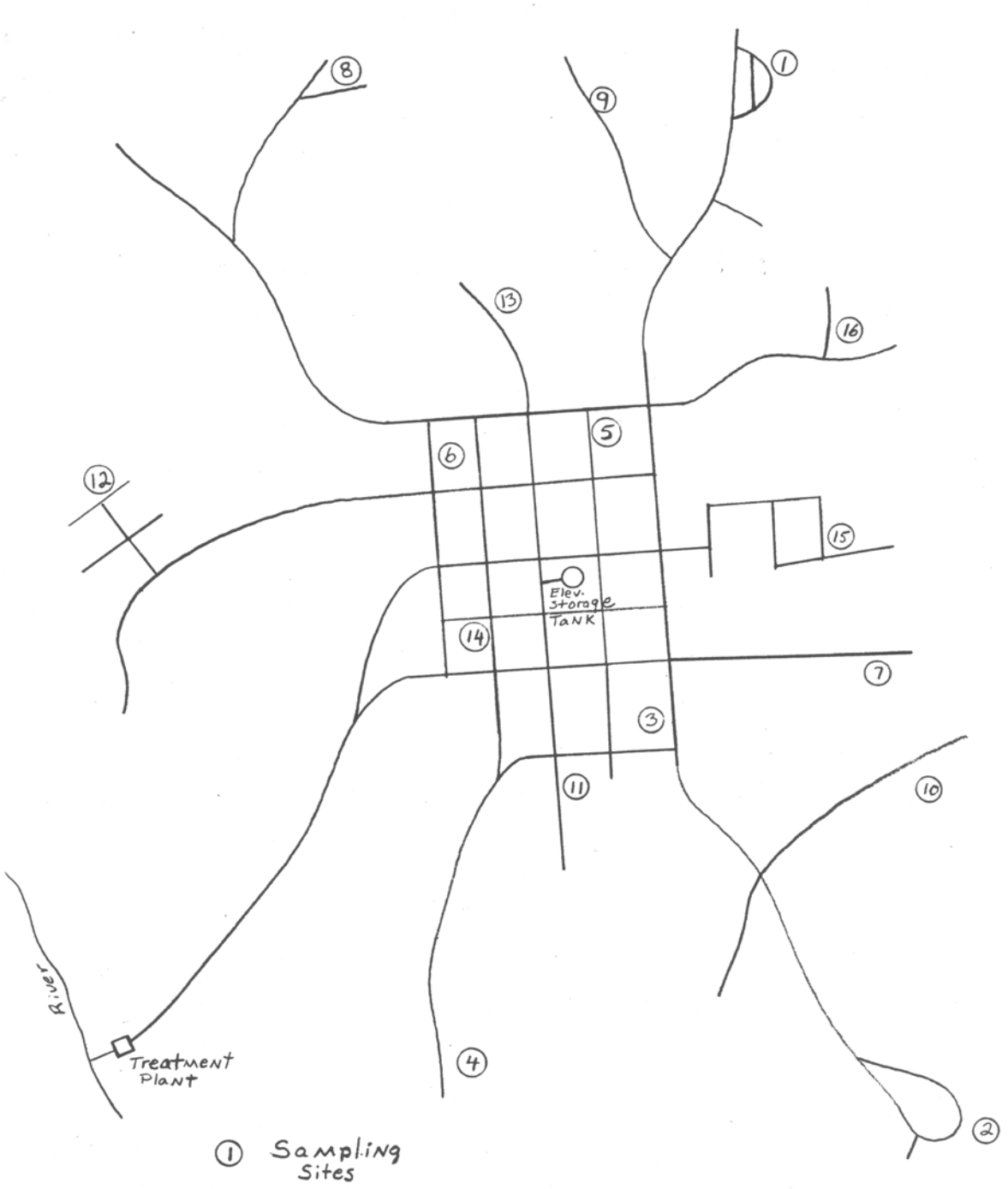


**FIGURE 2. SAMPLE SITING PLAN MAP FOR TIGER TOWN**